REMARKS

Upon entry of this amendment, claims 1-18 are all the claims pending in the application. New claims 10-18 have been added. No new matter has been added.

Applicant thanks the Examiner for acknowledging the claim to foreign priority and for confirming that the certified copy of the priority document was received.

Applicant also thanks the Examiner for initialing the references listed on form PTO-1449 submitted with the Information Disclosure Statements filed on April 6, 2001 and August 21, 2002.

I. Claim Rejections under 35 U.S.C. § 112, first paragraph

Claims 1-9 are rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Applicants traverse the rejection on the following basis.

The Examiner asserts that the specification does not include an operational situation in which a user would find it necessary to use a radio communication function and an infrared function simultaneously. It appears from this statement that the Examiner is actually questioning the intended use of the claimed invention rather than the enablement of the claimed invention. Intended use and enablement are separate issues. The test for resolving the issue of enablement is whether one reasonably skilled in the art could make and use the claimed invention from the

disclosure coupled with information known in the art without undue experimentation. *See, e.g., Northern Telecom v. Datapoint* 15 USPQ2d 1321, 1328-30 (Fed. Cir. 1990).

A specification disclosure must be taken as in compliance with the enabling requirement of the first paragraph of § 112 unless there is reason to doubt the objective truth of the statements contained therein. It is incumbent upon the Patent Office, whenever a rejection on this basis is made, to explain why it doubts the truth or accuracy of any statement in a supporting disclosure and to back up assertions of its own with acceptable evidence or reasoning which is inconsistent with the contested statement. *See In re Armbruster*, 185 USPQ 152, 153 (CCPA 1975).

Applicants submit that each limitation of the claimed invention is clearly enabled by the present disclosure. Indeed, the Examiner has not pointed to any particular limitation found in the claims which could be questioned regarding the issue of enablement. Rather, it only appears as though the Examiner questions an intended use of the claimed invention. An intended use of a claimed invention, however, cannot be the basis of an enablement rejection. Further, the Examiner has not pointed to any language in the disclosure indicating that there is doubt regarding the truth or accuracy of any statement. If the Examiner persists in this rejection, Applicants respectfully request that Examiner specifically point out the statement in issue and provide evidence or reasoning which is inconsistent with any such contested statement.

The Examiner also asserts that there is an issue with the position of the portable radio terminal while the radio communication function and infrared communication function are both operating. As discussed above, the test for resolving the issue of enablement is whether one reasonably skilled in the art could make and use the claimed invention from the disclosure

coupled with information known in the art without undue experimentation. Applicants submit that one of ordinary skill in the art would clearly understand how the portable radio terminal could be positioned so that the radio communication function and infrared communication function operate together.

Indeed, the Examiner has pointed to several well known examples including personal digital assistants and hands-free type devices, each of which would provide adequate positioning for the portable radio device portable radio device. Devices such as personal digital assistants and hands free devices are clearly well known to those of ordinary skill in the art. An inventor is not required to explain every detail since he is speaking to those skilled in the art. "What is conventional knowledge will be read into the disclosure." *In re Howarth*, 210 USPQ 689, 691-92 (CCPA 1981).

Based on the foregoing, Applicants submit that one of ordinary skill in the art, given the application's disclosure and knowledge generally available in the art, could implement the claimed invention without undue experimentation. Accordingly, Applicants respectfully request that the rejection be reconsidered and withdrawn.

II. Claim Rejections under 35 U.S.C. § 103(a)

Claims 1-9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Liukkonen et al. (U.S. Patent. No. 6,230,214) in view of Descombes (U.S. Patent No. 6,377,429).

Applicants submit that the Descombes reference can be antedated by perfecting the claim to foreign priority based on Applicants' own priority document, JP 11-235009. The filing date of the Descombes reference is April 19, 2000, which is after the application's foreign priority date of August 23, 1999. Accompanying this Amendment is a certified translation of Applicants' priority document, thereby perfecting a claim to priority under 35 U.S.C. § 119(a)-(d). Therefore, the rejection of claims 1-9 under 35 U.S.C. § 103(a) should be withdrawn.

III. New Claims

New claims 10-18 are added for additional claim coverage merited by the scope of the invention. Applicants submit that these claims are patentable based on the combination of features recited therein.

IV. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Applicants hereby petition for any extension of time which may be required to maintain the pendency of this case, and any required fee, except for the Issue Fee, for such extension is to be charged to Deposit Account No. 19-4880.

Respectfully submitted,

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Date: January 23, 2003

APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

The claims are amended as follows:

1. (Amended) A communication method for a portable radio terminal with an infrared communication function, said communication method comprising:

[a step of] judging whether a radio communication function section is in radio communication or not; and

[a step of] controlling a driving current of a light emitting element in an infrared communication function section [in accordance with a judgement].

3. (Amended) The communication method for a portable radio terminal with an infrared communication function according to Claim 1, wherein [it] a user is notified that a communicable distance of said infrared communication function is restricted when the radio communication function section is in radio communication.

4. (Amended) A communication method for a portable radio terminal with an infrared communication function, said communication method comprising:

[a step of] judging whether a radio communication function section is in radio communication or not; and

[a step of] selecting an infrared communication function section among a plurality of infrared communication function sections [functions in accordance with a judgement].

5. (Amended) The communication method for a portable radio terminal with an infrared communication function according to Claim 4, wherein said infrared communication function section is selected among said plurality of infrared communication function sections [functions] in accordance with a transmission power value of said radio communication function section.

6. (Amended) The communication method for a portable radio terminal with an infrared communication function according to Claim 4, wherein [it] a user is notified that a communicable distance of said infrared communication function is restricted when the radio communication function section is in radio communication.

7. (Amended) A portable radio terminal with an infrared communication function comprising:

a radio communication function section;

an infrared communication function section; and

an information processing section [for detecting] operable to detect a function state of said radio communication function section and [for controlling] operable to control an infrared output from said infrared communication function section.

8. (Amended) The portable radio terminal with an infrared communication function according to Claim 7, wherein said function state indicates whether there is [a] radio output [of] from said radio communication function section[, and said infrared output is controlled to be small when said radio output is larger].

9. (Amended) The portable radio terminal with an infrared communication function according to Claim 8, wherein said [small] infrared output is controlled so as to restrict [corresponds to restricting] a communicable distance of said infrared communication function when said function state indicates radio output from said radio communication function section.

Claims 10-18 are added as new claims.

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DECLARATION

I, Hiroko UEDA of c/o NISHIMURA INTERNATIONAL PATENT OFFICE, NAKAMURA Building No. 1, 2-6, Kitaurawa 4-chome, Saitama, Saitama, Japan, understood both English and Japanese, am the translator of English document attached, and do hereby declare and state that the attached English document contains an accurate translation of official certified copy of Japanese Patent Application, Application No.Hei 11-235009, and that all statements and made herein are true to the best of my knowledge.

Declared in Saitama, Saitama, Japan

This 6th day of January 2003

Hiroko Ueda

Hiroko UEDA

【Title of the Document】 Specification

【Title of the Invention】 PORTABLE RADIO TERMINAL WITH INFRARED COMMUNICATION FUNCTION AND COMMUNICATION METHOD FOR PORTABLE RADIO TERMINAL

【What is claimed is】

【Claim 1】 A communication method for a portable radio terminal with an infrared communication function, said communication method comprising:

a step of judging whether a radio communication function section is in radio communication or not; and

a step of controlling a driving current of a light emitting element in an infrared communication function section in accordance with said judgment.

【Claim 2】 The communication method for a portable radio terminal with an infrared communication function according to Claim 1, wherein said driving current of said light emitting element in said infrared communication function section is controlled in accordance with a transmission power value of said radio communication function section.

【Claim 3】 A communication method for a portable radio terminal with an infrared communication function, said communication method comprising:

a step of judging whether a radio communication function section is in radio communication or not; and

a step of selecting an infrared communication function among a plurality of infrared communication functions in accordance with said judgment.

【Claim 4】 The communication method for a portable radio

terminal with an infrared communication function according to Claim 3, wherein said infrared communication function is selected among said plurality of infrared communication functions in accordance a transmission power value of said radio communication function section.

【Claim 5】 The communication method for a portable radio terminal with an infrared communication function according to Claim 1 or 3, further comprising:

a step of notifying wherein it is notified that a communicable distance of said infrared communication function is restricted.

【Claim 6】 A portable radio terminal with an infrared communication function comprising:

a radio communication function section;

an infrared communication function section; and

an information processing section for detecting a function state of said radio communication function section and for controlling an infrared output from said infrared communication function section.

【Claim 7】 The portable radio terminal with an infrared communication function according to Claim 6,wherein said function state is a radio output of said radio communication function section, and said infrared output is controlled to be small when said radio output is larger.

【Claim 8】 The portable radio terminal with an infrared communication function according to Claim 7, wherein said small infrared output corresponds to restricting a communicable distance of said infrared communication function.

【Detailed Description of the Invention】

【0001】

【Technical Field to which the Invention belongs】

The present invention relates to a portable radio terminal with an infrared communication function and a communication method for the portable radio terminal, and more particularly to the portable radio terminal with the infrared communication function and the communication method for the portable radio terminal for power control when infrared communication and radio communication are executed simultaneously.

【0002】

【Prior Art】

A radio communication function transmits radio waves in order to carry out radio communications. Transmission power to transmit radio waves generally requires a large consumption of electric current (for example, in a case that an RCR STD-27 digital radiophone system, such as a PDC (Personal Digital Cellular) system, is used as a radio communication system). On other hand, an infrared communication function also requires a large consumption of electric current in order to make an emitting element emit. Therefore, in a case that an infrared communication function is provided in a radio portable information terminal using a battery as a power source, when the battery voltage drops, it becomes impossible to use the radio communication function and the infrared communication function simultaneously.

A kind of terminal is known, in which irrespective the remaining energy of the battery, it is restricted to use the radio communication function and the infrared communication function simultaneously from the beginning in order to give a longer lifetime of the battery for the radio portable information terminal, and a battery capacity and a power source circuit are minimized.

【0003】

In these known techniques, there are the following problems.

A first problem is that the radio communication function and the infrared communication function cannot be used simultaneously. As its causes, the infrared communication function requires a large consumption electric current and a communicable distance of the infrared communication function is required to be kept a constant distance or more.

A second problem is that a large battery capacity is required to use the radio communication function and the infrared communication function simultaneously and a battery becomes large in size. As its cause, both of the radio communication function and the infrared communication function require large consumption of electric current.

【0004】

It is desirable to control an increase of consumption electric of current when the radio communication function and the infrared communication function are executed simultaneously.

【0005】

【Problem to be solved by the Invention】

It is a subject of the present invention to provide a portable radio terminal with an infrared communication function and a communication method for the portable radio terminal, capable of controlling an increase of electric current consumption when a radio communication function and the infrared communication function are executed simultaneously.

【0006】

【Means to solve the problem】

Means to solve the problem is described as follows. A reference

number, or a sign with a bracket () is added to each of technical terms represented in the description are nodded. The reference numbers and signs are accordance with reference numbers and signs which are respectively labeled the technical terms configuring at least one of a plurality of modes or a plurality of embodiments of the present invention, especially the reference numbers or signs which are respectively labeled the technical terms drawn in the figure corresponding to the modes and the embodiments.

These reference numbers and signs serve as bridges for connecting the technical terms recited in the claims and the technical terms described in the modes or the embodiments.

However, these bridges is not intended that the scope of the present invention is limited to the modes or embodiments as described below

【0007】

The communication method for a portable radio terminal with infrared communication function according to the present invention comprises a step of judging whether the radio communication function section (104) is in radio communication or not (step S302) and a step of controlling a driving current of a light emitting element (201) in the infrared communication function section (102) in accordance with the judgment. The driving current of the light emitting element (201) for an infrared communication is controlled in accordance with an operation of the radio communication function section (104), therefore, it is possible to loosen a condition for enabling infrared communication.

【0008】

Thus, it is realized with ease to control the driving current value of the light emitting element (201) in the infrared

communication function section (102) in accordance with a transmission power value of the radio communication function section (104).

【0009】

The communication method for a portable radio terminal with infrared communication function according to the present invention comprises a step of judging whether the radio communication function section (104) is in radio communication or not and a step of selecting an infrared communication function among a plurality of infrared communication functions (102, 501, and 502) in accordance with the judgment.

The driving current of each light emitting element for an infrared communication is controlled in accordance with an operation of the radio communication function section (104), therefore, it is possible to loosen a condition for enabling infrared communication.

【0010】

A infrared communication function is selected among the plurality of infrared communication functions in accordance with the transmission power value of the radio communication function section (104). Furthermore, it is preferable that a communicable distance of the infrared communication function is restricted.

【0011】

The portable radio terminal with the infrared communication function according to the present invention comprises the radio communication function section (104), the infrared communication function section (102) and the information processing section (101) which controls the infrared communication output by detecting the function state of the radio communication function section (104).

The function state is a radio output of the radio communication function section and a preferable mode is one wherein the infrared output is controlled to be small when the radio output is larger.

The small infrared output corresponds to restricting the communicable distance of the infrared communication function.

【0012】

As described above, the portable radio terminal with an infrared communication function and radio communication function using a battery as a power source is capable of using the infrared communication function though the radio communication function is in radio communication.

The driving current control section (103) is a circuit controlling a driving current of emitting element in the infrared communication function section (102) based on a signal transmitted from information processing section (101).

When the radio communication function section (104) is in radio communication, the information processing section (101) send a signal to driving current control section (103), and the driving current control section (103) controls the driving current of the emitting element so as to restrict the driving current value. Further, in a case that the radio communication function section (104) has a variable function capable of controlling variably a transmission power, information processing section (101) controls the restriction level of a driving current value of light emitting element, in accordance with a state of transmission power control, that is, a transmission power value.

【0013】

If an arrival distance of the infrared communication function is restricted to be short, available is the infrared communication

function even though the radio communication function is in radio communication.

When a driving current of light emitting element is restricted and hereby a communicable distance of the infrared communication is restricted to be short, it is notified by an output drive (108) that a communicable distance is restricted. With this configuration, even though a communicable distance of infrared communication is restricted, it is possible to prevent utility from reducing.

【0014】

【Modes for carrying out the Invention】

As shown in the figures, a mode of a portable radio terminal with an infrared communication function according to the present invention is provided with an information processing section together with an infrared communication function section

The information processing section 101 operates by program control and is connected to the infrared communication function section 102 bidirectionally as shown in Fig.1.

The infrared communication function section 102 is capable of infrared-communicating with another apparatus (not shown) with the infrared communication function.

The information processing section 101 is connected to the driving current control section 103.

【0015】

The radio communication function section 104 capable of radio-communicating is connected to the information processing section 101 bidirectionally. The battery 105 is connected to the power source section 106. The power source section 106 stabilizes a voltage of the battery 105 and distributes stabilized voltage to each section.

The input device 107 such as a keyboard is connected to the information processing section 101.

The information processing section 101 is connected to the output device 108 such as an LCD.

【0016】

The infrared communication function section 102, as shown in Fig. 2, is provided with a light emitting element 201 such as an infrared LED (Light Emitting Diode) for emitting infrared signals, a light receiving element 202 such as a phototransistor for receiving infrared signals and a first signal conversion section 203 for coordinating a signal level between both of the light element 201 and202 and the information processing section 101.

【0017】

The driving current control section 103, as shown in Fig. 2, is provided with a current control section 204 for changing a driving current of the light emitting element 201 in the infrared communication function section 102, in accordance with the control pf the information processing section 101. The current control section 204 can set a driving current value to a first current value, a second current value and a third current value.

【0018】

The radio communication function section 104 is provided with a transmission power amplification section 205 and a transmission power control section 206. The transmission power control section 206 controls and optimizes a transmission power in accordance with a distance from a base station and an usage situation.

The information processing section 101 is provided with a first control means for outputting a control signal 211 restricting a driving current of the light emitting element 201 to the driving

current control section 103 when the radio communication function section 104 is in radio communication, and a second control means for outputting a switching signal 212 switching control levels of the driving current of the light emitting element 201 based on a transmitting power value of the radio communication function section 104.

【0019】

Figure 4 shows a concrete circuit diagram for showing further concretely the above circuit block diagrams shown in Figs. 1 and 2.

The light emitting element 201 is provided with an infrared LED 412, and the light receiving element 202 is provided with a photodiode 413.

The signal conversion section 203 is provided with a driver 414 for driving the infrared LED 412 and an amplifier 415 for amplifying electric signals from the photodiode 413.

Analog electric signals amplified by the amplifier 415 are converted into digital signals by a comparator 416.

A driver 417 makes the digital signals coincide with signals of the information processing section 101 as to a signal level.

【0020】

The current control section 204 in the driving current control section 103 is provided with a current restriction resistor A 405, a current restriction resistor B 406 and a current restriction resistor C 407 for restricting respectively the driving current of the infrared LED 412, a first FET 401 to short-circuit the current restriction resistor A 405, a second FET 402 for driving the first FET 401, a third FET 403 to short-circuit the current restriction resistor A 405 and the current restriction resistor B 406, a fourth

FET 404 for driving the third FET 403, a pull-up resistor A 408 and a pull-up resistor B 409.

【0021】

Figure 3 shows an operation of the first embodiment according to the present invention.

When starting the infrared communication function is requested to the information processing section 101 by the input device 107 (Step S301), the information processing section 101 judges whether the radio communication function section 104 is in radio communication or not, before executing an infrared communication operation (Step S302). When the radio communication function section 104 is not in radio communication, the information processing section 101 sets a driving current value of the light emitting element 201 in the infrared communication function section 102 to a first current value I-1 for the current control section 204 in the driving current control section 103 (Step S307). The first current value I-1 gives no restriction to the driving current of the light emitting element 201.

【0022】

On the other hand, when the radio communication function section 104 is in radio communication, the information processing section 101 also judges a transmission power value of the radio communication function section 104 in accordance with information from the transmission power control section 206. When the transmission power value is lower than a predetermined first threshold (Step S304: No), the information processing section 101 sets a driving current value of the light emitting element 201 in the infrared communication function section 102 to a second current value I-2 for the current control section 204 in the driving current control section 103 (Step

S306). The second current value I-2 restricts the driving current of the light emitting element 201. When the transmission power value is higher than the predetermined first threshold (Step S304: YES), the information processing section 101 sets a driving current value of the light emitting element 201 in the infrared communication function section 102 to a third current value I-3 for the current control section 204 in the driving current control section 103 (Step S305). The third current value I-3 further restricts the driving current of the light emitting element 201 more than the second current value I-2.

【0023】

With these current restrictions, a consumption power of the light emitting element 201 is deduced and an arrival distance of infrared emitted from the light emitting element 201 is restricted. The output device 108 indicates that a communicable distance of the infrared communication is restricted in this way (Step S308). As above described, after the driving current of the light emitting element 201 is determined based on the remaining energy of the battery, the infrared communication operation is executed (Step S309), and the infrared communication operation is finished (Step S310).

【0024】

Next, concrete descriptions will be given of the operation with the circuit diagrams. When not in radio communication (Step S302: No), the information processing section 101 outputs a signal of a HI (high) level to a control line 411 and outputs a signal of a LOW level to a control line 410 for the current control section 204 in the driving current control 103. With these outputs, the fourth FET 404 is turned ON and the third FET 403 is also turned ON. Both sides of the current restriction resistor A 405 and the

current restriction resistor B 406 are short—circuited, the driving current of the infrared LED 412 is restricted by the resistance value of the current restriction resistor C 407, and the first current value I-1 can be set.

【0025】

On the other hand, when in radio communication (Step S302: YES), when a transmission power is lower than a first predetermined threshold (Step S304: No), the information processing section 101 outputs a signal of a HI level to the control line 410 and outputs a signal of a LOW level to the control line 411 for the current control section 204 in the driving current control section 103. The second FET 402 is turned ON and the first FET 401 is also turned ON. Therefore both sides of only the current restriction resistor A 405 are short-circuited, the driving current of the infrared LED 412 is restricted by the total resistance value of the current restriction resistor B 406 and the current restriction resistor C 407, and the second current value I-2 can be set.

【0026】

In radio communication (Step S302: Yes), when a transmission power value is higher than a first predetermined threshold (Step S304: Yes), the information processing section 101 outputs signals of LOW levels to the control line 410 and to the control line 411 for the current control section 204 in the driving current control section 103. All of FETs are turned OFF, the driving current of the infrared LED 412 is restricted by the total resistance value of the current restriction resistor A 405, the current restriction resistor B 406 and the current restriction resistor C 407, and the third current value I-3 can be set.

【0027】

In the embodiment as described above, the explanations are given in a case that one threshold is used for judgment of the transmission power value of the radio communication section and two restricted driving current values of the light emitting element are used. However, two and more thresholds may be used to judge detected results of transmission power values and three and more driving current values of light emitting elements may be used in accordance with the number of thresholds.

【0028】

In the embodiment as described above, a case is described in that the radio communication function section has a function to control a transmission power, however, though there is no function controlling the transmission power, the driving current of the light emitting element is restricted only whether in radio communication or not, and thereby similar effects can be obtained.

【0029】

(Another embodiment of the present invention)

Figure 5 shows another embodiment of a portable radio terminal with an infrared communication function according to the present invention.

The portable radio terminal with the infrared communication function according to this embodiment as another embodiment is different from that of the embodiment as described above in being provided with a second infrared communication function section 501 and a third infrared communication function section 502 instead of a driving current control section 103.

A driving current of a light emitting element in the second infrared communication function section 501 is set to a value lower than a driving current of a light emitting element in the first

infrared communication function section 102.

Further, a driving current of a light emitting element in the third infrared communication function section 502 is set to a value lower than the driving current of the light emitting element in the second infrared communication function section 501.

【0030】

Figure 6 shows an operation of this embodiment as another embodiment.

When starting the infrared communication function is requested to an information processing section 101 by an input device 107 (Step S601), the information processing section 101 judges whether a radio communication function section 104 is in radio communication or not before executing an infrared communication operation (Step S602).

When the radio communication function section 104 is not in radio communication (Step S602: No), the information processing section 101 executes the infrared communication by the first infrared communication function section 102 (Step S606).

No restriction is given to the driving current of the light emitting element in the first infrared communication function section 102.

【0031】

On the other hand, when the radio communication function section 104 is in radio communication (Step S602: Yes), the information processing section 101 judges the transmission power value of the radio communication function section 104 based on information from a transmission power control section 206.

When the transmission power value is lower than a predetermined first threshold (Step S603: No), the information processing section

101 executes infrared communications using the second infrared communication function section 501 (Step S605) and, at a same time, an output device 108 notifies to a person having the portable radio terminal that a communicable distance.

When the transmission power value is lower than a predetermined first threshold (Step S603: No), the information processing section 101 executes infrared communications using the second infrared communication function section 501 (Step S605) and, at a same time, an output device 108 notifies to a person having the portable radio terminal that a communicable distance of the infrared communications is restricted (Step S607). A restriction is given to the driving current of the light emitting element in the second infrared communication function section 501.

【0032】

When the transmission power value is higher than the predetermined first threshold (Step S603: Yes), the information processing section 101 executes infrared communications using the third infrared communication function section 502 (Step S604) and, at a same time, the output device 108 notifies to the person having the portable radio terminal that a communicable distance of the infrared communications is restricted (Step S607). A further restriction is given to the driving current of the light emitting element in the third infrared communication function section 502 rather than the second infrared communication function section 501. In this way, the infrared communication function is selected, the selected infrared communication operation is executed and the infrared communication operation is finished (Step S608).

【0033】

【Effect of the Invention】

With the infrared communication function and the communication method according to the present invention, it is possible to use the infrared communication function with the portable radio terminal though the radio communication function is in radio communication. Because, it is judged while in infrared communication whether it is in radio communication or not. When it is in radio communication, the driving current of the light emitting element is controlled and the driving current value is restricted. In addition to such a first effect, it is possible to extend battery life time as a second effect. Because, it is possible to select a driving current of the light emitting element in accordance with a transmission power value of the radio communication function section. Further, as a third effect, it is possible to make necessary battery capacity and power circuits small. Because, when the infrared communication function and the radio communication function are operated at the same time, the driving current of the light emitting element in infrared communication function section and the driving current value is restricted. Further, as a forth effect, a person having this terminal can know whether a communicable distance of the infrared communication is restricted or not because the restriction is notified to the person having the terminal while the driving current of the light emitting value is restricted.

【Brief Description of the Drawings】

【Fig. 1】

Fig. 1 is a circuit block diagram showing an embodiment of a portable radio terminal with an infrared communication function according to the present invention.

【Fig.2】

Fig. 2 is a circuit block diagram showing details of a part

of Fig. 1.

【Fig. 3】

Fig. 3 is an operational flowchart showing an embodiment of a communication method of the portable radio terminal with the infrared communication function according to the present invention.

【Fig. 4】

Fig. 4 is a circuit diagram showing further details of the portable radio terminal with the infrared communication function according to the present invention.

【Fig. 5】

Fig. 5 is a circuit block diagram showing another embodiment of a portable radio terminal with an infrared communication function according to the present invention.

【Fig. 6】

Fig. 6 is an operational flowchart showing another embodiment of a communication method of the portable radio terminal with the infrared communication function according to the present invention.

【Explanation of Characters】

101 information processing section

102, 501, 502 infrared communication function section

103 driving current control section

104 radio communication function section

201 light emitting element

108 output device

【Title of the Document】 Abstract

【Abstract】

【Problem】

Preventing consumption power from increasing when a radio communication function and an infrared communication function are used at a same time.

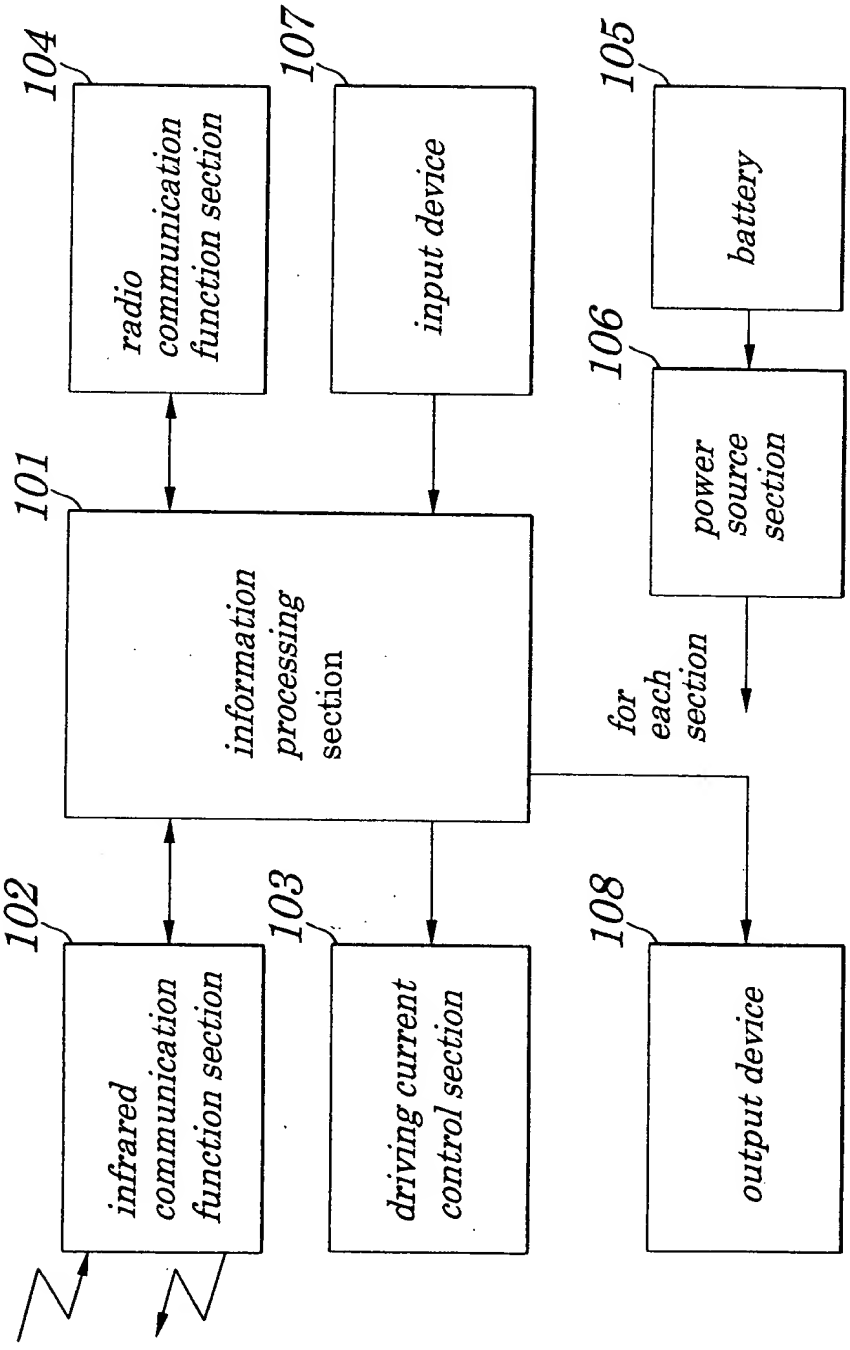
【Means to solve the problem】

A radio communication function section (104) is judged whether in radio communication or not, and a driving current of an light emitting element (201) in an infrared communication function section (102). The driving current of the light emitting element (201) for an infrared communication is controlled in accordance with an operation of the radio communication function section (104), therefore, it is possible to loosen a condition for enabling infrared communication. As to restrictions for outputs from light emitting elements (201), a driving current of a light emitting element is controlled or plural light emitting elements having respective outputs are selectively driven.

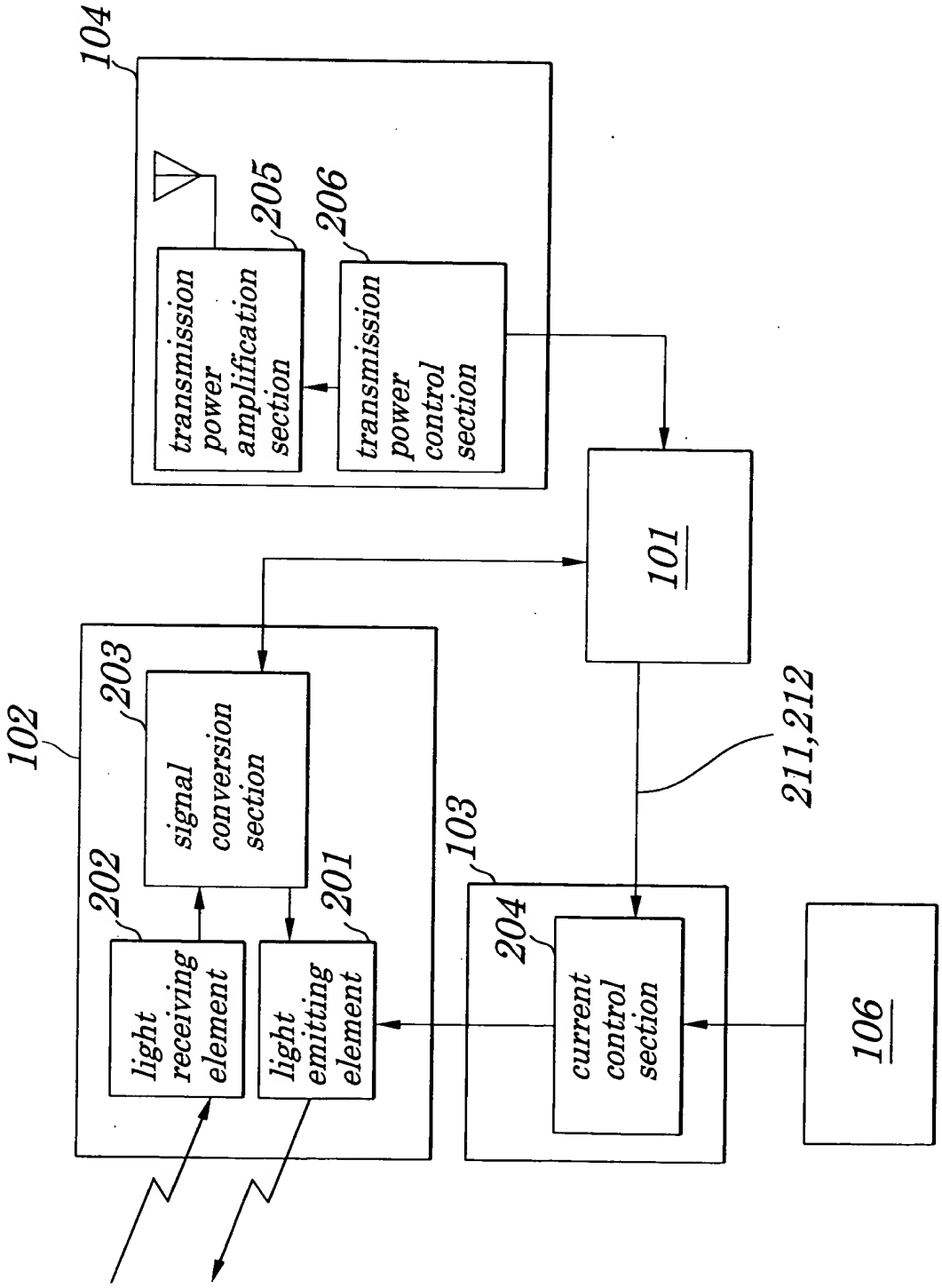
【Representative Drawing】 Fig. 1

【 Title of the Document 】 Drawings

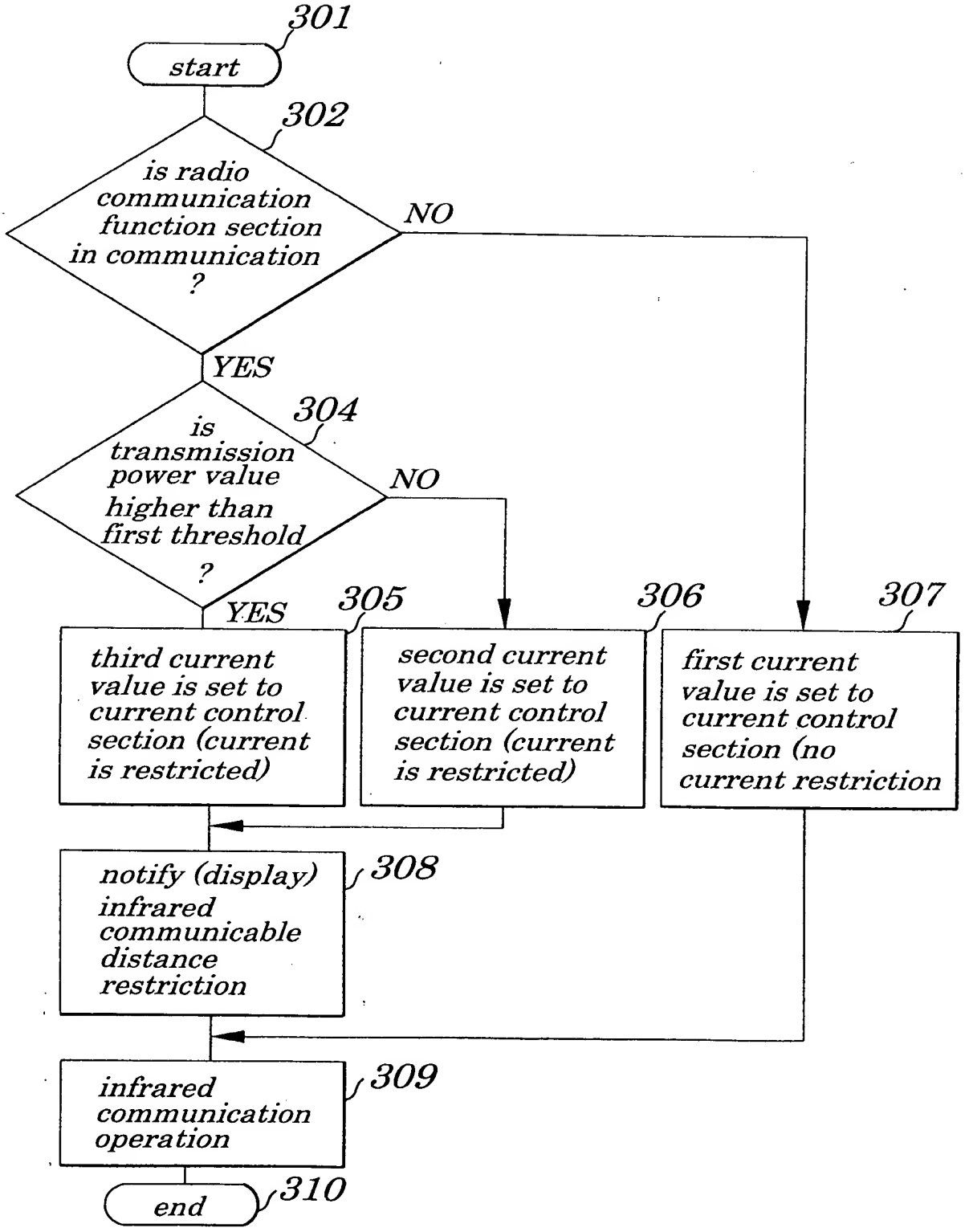
【FIG.1】



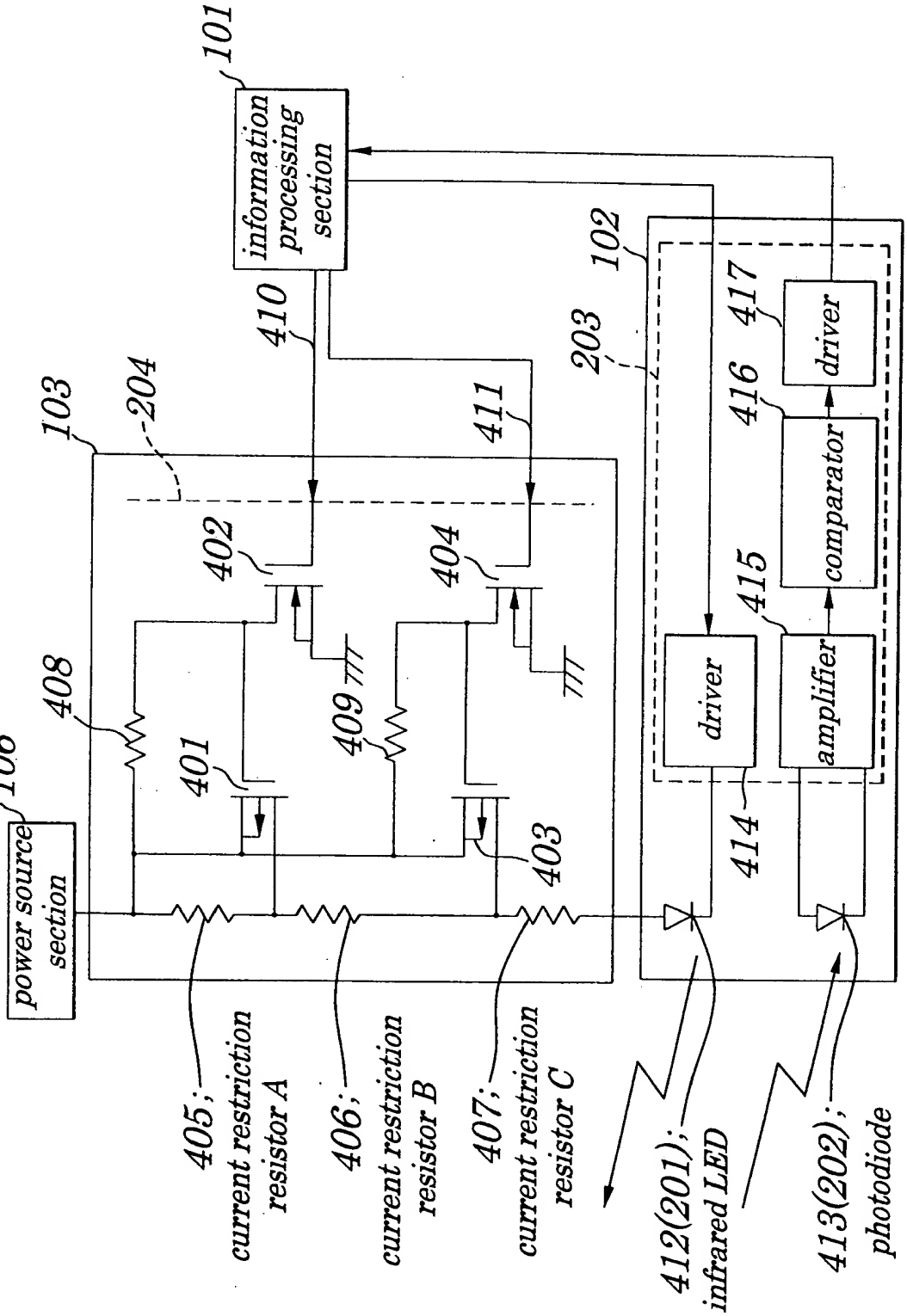
【FIG.2】



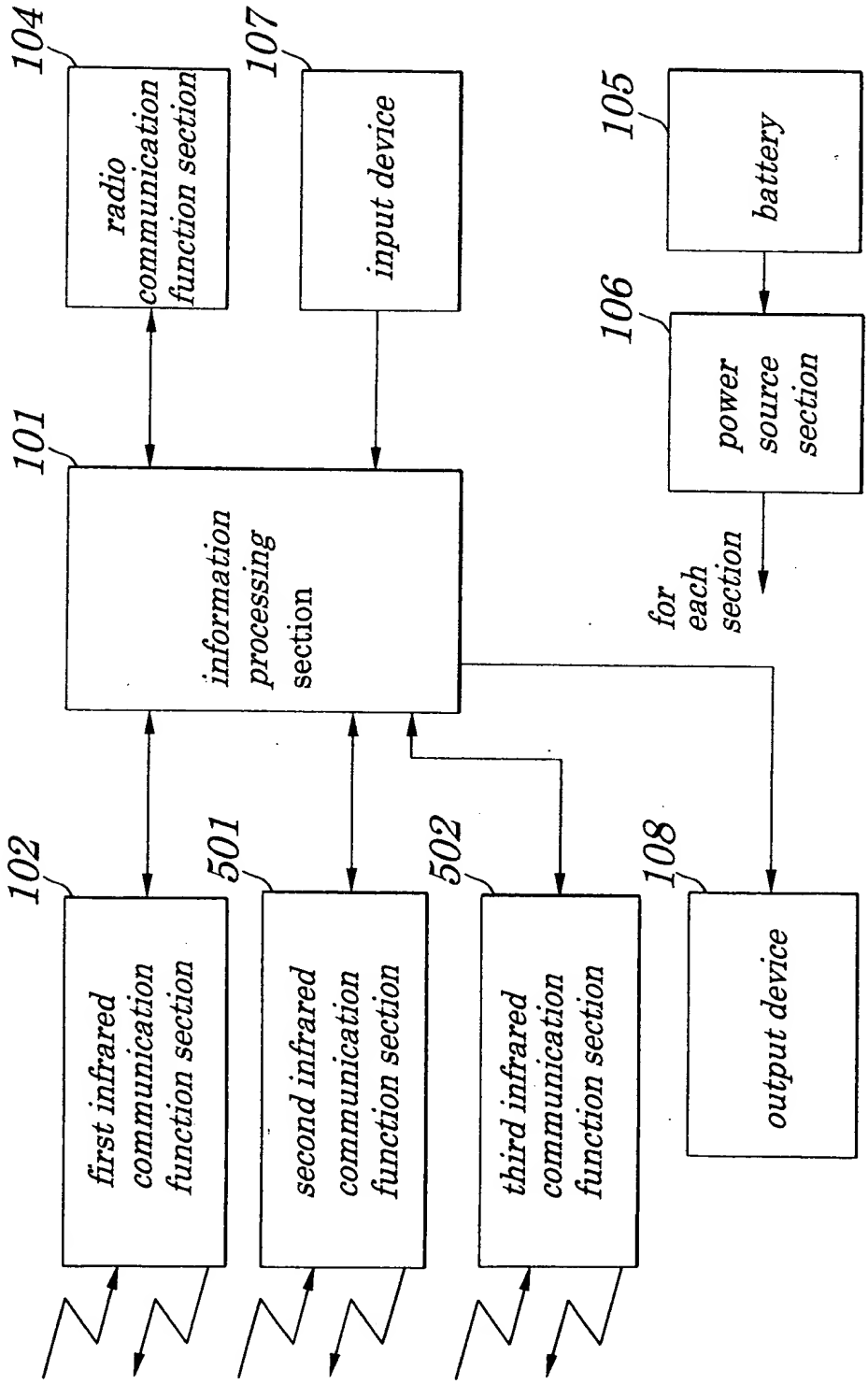
【FIG.3】



【FIG.4】



【FIG.5】



【FIG.6】